

- 21 -

C L A I M S

1. A sparger system for use in a reactor, the sparger system comprising a gas outlet for passing gas into the reactor, and a gas distribution system to supply the gas to the outlet, wherein the gas distribution system  
5 feeding a sparger with gas to be ejected from the gas outlet is disposed above the sparger outlet in the system.
2. A sparger system as claimed in claim 1, wherein the gas outlet is adapted to eject gas across the floor of  
10 the reactor.
3. A sparger system as claimed in claim 1 or claim 2, wherein the sparger outlet is located at the end of the sparger, which is in turn located at the end of a distribution conduit feeding the gas to the sparger.
- 15 4. A sparger system as claimed in any preceding claim, wherein the distance between the gas outlet and the reactor floor is less than 10 cm and/or the distance between the sparger gas outlets is at least 15 cm below the distribution system, preferably the sparger outlets  
20 are at least 30 cm below the distribution system.
5. A sparger system as claimed in any preceding claim, wherein the gas outlet incorporates a flow controlling means to regulate the speed of the gas jet through the outlet.
- 25 6. A sparger system as claimed in claim 5, wherein the flow controlling means is a Venturi-type orifice, preferably the sparger has a shroud pipe to limit the injection velocity of the gas.

- 22 -

7. A sparger system as claimed in any preceding claim, wherein each sparger has a plurality of outlets directed outwardly from a sparger head and arranged equidistantly from one another around the periphery of the sparger head.

5

8. A reactor having a sparger system as claimed in any preceding claim, preferably a reactor having cooling means adapted for controlling exothermic reactions within the reactor, and wherein the spargers and the cooling means are arranged in corresponding patterns, more preferably a reactor wherein the gas outlets are disposed substantially parallel to, or are directed towards, the floor of the reactor.

10

9. A method for carrying out a reaction comprising the steps of charging a reactor with reactants and removing the reaction products from the reactor, wherein at least some of the reactants are fed into the reactor via a sparger device, which ejects the reactants through an outlet, and wherein the sparger device is fed with reactants via a distribution system that is disposed above the sparger, preferably a method wherein a plurality of sparger devices are spaced apart from one another on the floor of the reactor in a regular pattern, or a method wherein the sparger device ejects the reactants through an outlet across the floor of the reactor.

15

20

25

10. A process for the preparation of hydrocarbons in a reactor by reacting carbon monoxide and hydrogen in the presence of a catalyst, preferably a supported cobalt catalyst, and in the presence of liquid hydrocarbons, in which process the carbon monoxide and hydrogen are introduced into the reactor by means of a sparger system according to any one or more of claims 1 to 9, optionally

30

- 23 -

followed by hydrogenating and/or hydrocracking followed by distillation to obtain naphtha, kero, gasoil, waxy raffinate and/or base oil.